STUD MOUNTING SYSTEM

BACKGROUND OF THE INVENTION

This invention relates generally to motors, and more particularly, to mounting systems for motors.

At least some known mounting systems for motors include a plurality of bolts attached to an outer surface of a motor housing surrounding the motor. To enable the motor to be attached within an application, such as a refrigerator, the bolts extend radially outwardly from the motor and are spaced circumferentially around the motor housing.

During motor operation, the mounting systems are not only subjected to stresses from supporting the weight of the motor, but vibrational stresses may also be induced into the mounting system by the operating motor, and/or the operation of the associated attachment. Furthermore, because such motors are typically used to power other rotational equipment, the rotation of such equipment may also induce vibrational stresses into the motor mounting system.

Over time, such vibrational stresses may cause the mounting system hardware to loosen. Furthermore, continued operation may eventually cause premature failure of the mounting system. To facilitate preventing motor mounting system failure, complex mounting systems including structurally re-inforced attachment points are often used. However, because different applications require different motors, each motor includes a different mounting system, and as a result, fabrication costs associated with such motors may be increased.

BRIEF SUMMARY OF THE INVENTION

In one aspect, a housing for a motor is provided. The housing extends between a pair of endshields and includes an inner surface, an outer surface, and at least one raised projection extending outwardly from at least one of the housing inner and outer surfaces. The projection includes at least one opening extending

therethrough and at least one fastener configured to attach to the inner surface and extend outwardly through the housing opening.

In another aspect, a method for mounting a motor to a support using a mounting system is provided. The method employs a mounting system having a plurality of fasteners, a motor having a pair of endshields and a housing extending therebetween. The housing includes a plurality of openings. The method includes attaching the fasteners to an inner surface of the housing using a plurality of attachment points within the housing, such that the fasteners extend radially outwardly from the housing, and attaching the motor to the support using the plurality of fasteners.

In another aspect, a motor including a pair of endshields, a housing extending between the endshields is provided. The motor includes at least one raised projection extending outwardly from the housing, the projection includes at least one opening extending therethrough and at least one fastener configured to attach to the housing and extend outwardly through the housing. The motor also includes a stator-rotor assembly mounted in the housing.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a side view of a known motor housing.

Figure 2 is a side view of a motor housing.

Figure 3 is a perspective view of the motor housing shown in Figure 2.

Figure 4 is a cross-sectional view of the motor housing shown in Figure 2.

Figure 5 is an enlarged view of the motor housing shown in Figure 4 taken along area 5 shown in Figure 4.

DETAILED DESCRIPTION OF THE INVENTION

Figure 1 is a side view of a known motor housing 10 including a shell 12 having an inner surface 14 and an outer surface 16. Shell 12 defines a cavity 18 therein which a motor (not shown) is housed. A plurality of mounting hardware or fasteners 20 are attached to shell outer surface 16 and extend radially outwardly from shell outer surface 16. More specifically, fasteners 20 are spaced circumferentially around housing 10, and in the exemplary embodiment, are welded to shell outer surface 16.

Figure 2 is a side view of a motor housing 30 including a mounting system 31. Figure 3 is a perspective view of housing 30. Housing 30 extends circumferentially around a motor (not shown). In the exemplary embodiment, the motor is housed within a cavity 32 defined by housing 30 and a pair of endshields 34. In one embodiment, the motor is used in a heating, ventilation, and air conditioning system.

In the exemplary embodiment, endshields 34 are identical, and each has a bottom 36 and a sidewall 38 extending substantially perpendicular from an outer periphery of bottom 36. Sidewall 38 has, but is not limited to, a substantially circular cross-sectional profile. A plurality of openings 40 are disposed within each endshield 34. Openings 40 have a diameter 42 sized to receive fasteners 44 used to couple endshield 34 to housing 30. In the exemplary embodiment, openings 40 are spaced circumferentially around the outer periphery of endshield bottom 36.

Housing 30 includes a shell 50, an inner surface 52, and an outer surface 54. Shell 50 is substantially cylindrical and extends between endshields 34 such that motor cavity 32 is defined between motor housing 30 and endshields 34. Mounting system 31 is formed integrally with housing 30 and includes a plurality of raised projections 60 that extend from housing outer surface 54 a distance 62. In the exemplary embodiment, projections 60 are formed integrally with housing 30.

Projections 60 are spaced circumferentially around housing 30 such that adjacent projections 60 are equi-spaced at an angle Φ measured with respect to a center axis of symmetry 64 of the motor, and with respect to each other. In the exemplary embodiment, angle Φ is approximately ninety degrees and housing 30 includes four projections 60 in the same cross-sectional plane. In an alternative embodiment, angle Φ is less than ninety degrees, and housing 30 includes more than four projections 60 in the same cross-sectional plane. In a further alternative embodiment, angle Φ is more than ninety degrees, and housing 30 includes less than four projections 60 in the same cross-sectional plane. In yet another embodiment, projections 60 are not equi-spaced circumferentially around housing 30.

In the exemplary embodiment, projections 60 are identical, and each projection has an outer diameter 66. In an alternative embodiment, projections 60 are non-identical and are sized differently. An opening 68 extends substantially concentrically through each projection 60. Each opening 68 has a diameter 70 that is sized to receive a fastener 80 therethrough. Fastener 80 enables housing 30 to be coupled an applicable support (not shown). In the exemplary embodiment, each fastener 80 is threaded and includes a head 82 including a top surface 84 and a bottom surface 86. Each respective projection 60 is sized to receive fastener head 82 such that head top surface 84 is substantially co-planar with housing inner surface 52 when fastener 80 is fully installed within each projection 60.

In the exemplary embodiment, each respective projection 60 is sized to receive fastener head 82 such that head bottom surface 86 is substantially flush with housing inner surface when fastener 80 is fully installed within each projection 60. In an alternative embodiment, head bottom surface 86 is welded to housing inner surface.

Figure 4 is a cross-sectional view of motor housing 30 shown in Figure 2. Figure 5 is an enlarged view of the motor housing 30 shown in Figure 4 taken along area 5 shown in Figure 4. Each projection 60 extends a distance 62 from outer surface 54 such that a recess 100 defined therein. Recess 100 includes a depth 102 and inner surface 104 with a diameter 106. Recess depth 102 is sized to receive

fastener head 82 such that fastener head top surface 84 is substantially co-planar with housing inner surface 52. Recess inner surface 104 is substantially parallel to shell 50 such that when fastener 80 is installed head bottom surface 86 is substantially flush with inner surface 104. Opening 68 extends substantially concentrically through recess 100. Each opening 68 has a diameter 70 that is sized to receive fastener 80 therethrough.

Projection 60 extends from inner surface 52 and outer surface 54 a distance 62. In the exemplary embodiment, recess 100 is sized to receive a fastener head 82 such that head 82 is disposed substantially co-planar within recess 100 and does not protrude into cavity 32 and fastener 80 extends radially through opening 68. Disposing head 32 substantially co-planar within recess 100 facilitates ease of insertion of the motor into housing 30.

The above described motor housing mounting system for securing a motor to a support is cost-effective and reliable. Each projection 60 includes a recess configured to provide a greater surface area for fastener attachment, and thus greater stability against typical vibrational stresses of motors. In the exemplary embodiment, the recess is crimped to the fasteners to facilitate fastener retention during operation of the motors and provide additional structural support to the fasteners. In an alternative embodiment, the fasteners are welded to the recess. The practice of disposing the fastener through the housing opening supports the fastener and reduces the chance of premature failure of the mounting system.

While the invention has been described in terms of various specific embodiments, those skilled in the art will recognize that the invention can be practiced with modification within the spirit and scope of the claims.